

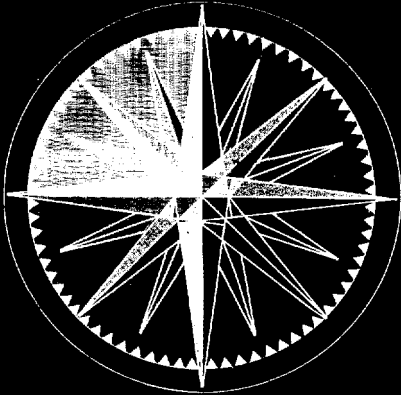
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Release 2006/11/08 : CIA-RDP79-00927A004900120003-5

23 July 1965



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SPECIAL REPORT

THE RACE FOR THIRD IN SPACE

MORI/CDF Pages 1-7

CENTRAL INTELLIGENCE AGENCY
OFFICE OF CURRENT INTELLIGENCE
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THE RACE FOR THIRD IN SPACE

Nearly eight years have elapsed since the first artificial earth satellite, Sputnik-1, was placed in orbit. Since then a number of countries have embarked on space programs which vary widely in scope. The more modest ones are aimed at launching simple rockets for making studies of the earth's atmosphere. Some others are ambitious, long-term projects with the goal of launching satellites using native-designed launch vehicles. The programs of France, Japan, and probably Communist China include orbiting an earth satellite, and at least one of them is likely to do so within the next year. France now appears to have the best chance of success.

A relatively simple system will be sufficient for a first attempt. Both Japan and France are capable of building the launch vehicle. Information on Chinese capabilities is limited, but China also could probably build a launch vehicle. France already has a suitable guidance system for the rocket and Communist China probably can develop such a system. Japan will use a guidance system purchased from the United States. The satellites involved will almost certainly be small and will probably carry little instrumentation other than a radio transmitter to broadcast the achievement to the world.

A successful satellite launch by any of these countries using a native-designed rocket would undoubtedly be exploited to show that that country was approaching the scientific abilities of the US and the USSR.

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France

The French space program is based on the Diamant, a three-stage satellite launch vehicle. The liquid-propellant first stage is called Emeraude, the solid-propellant second stage is called Topaze, and the third stage, which

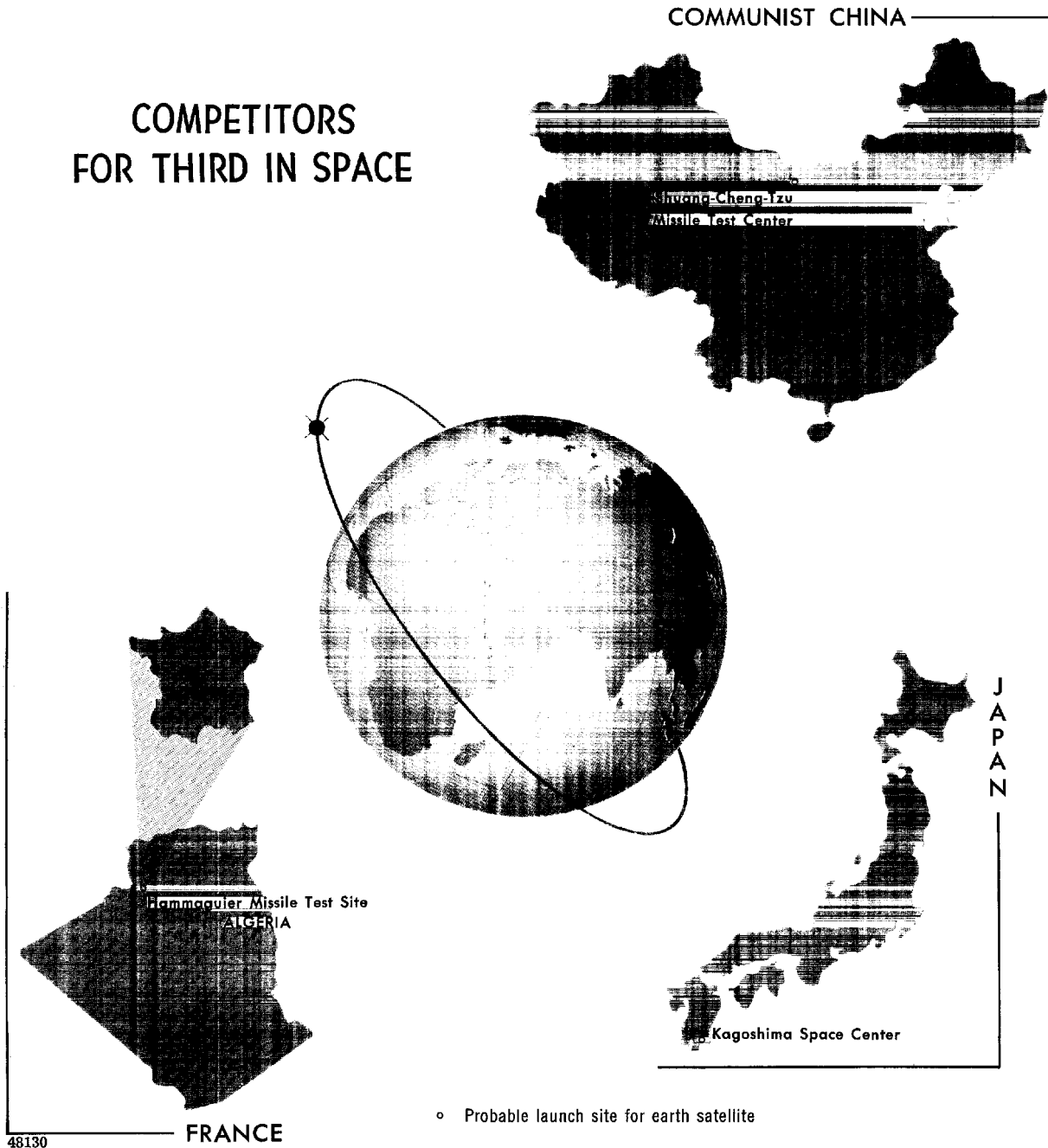
also uses solid propellants, is unnamed. The French have long planned to use the Diamant to orbit a 40-pound satellite.

For the past several years the pace of the Diamant program has been slow, chiefly because of difficulties with the first

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stage and because of budget limitations. Since February, however, when the first stage was first successfully flight-tested there has been a marked increase in the momentum of the program. A subsequent successful flight test of the first-stage vehicle suggests that the earlier difficulties have been solved. The second stage reportedly has been test-fired more than ten times and four flight tests of the combined first and second stages (when fired together as a single rocket, these two stages are called the Saphir) are scheduled for 1965. Two of these reportedly took place this month. One was said to be successful while the other failed to reach the planned altitude. Three third-stage test firings occurred in rapid succession during the first week of June.

If the problems with the first stage booster have been solved, the French would appear to have a good chance of orbiting a small satellite in the fall.

Japan

The Japanese space program is being conducted by Tokyo University and the Japanese Science and Technology Agency. Both are working toward the orbiting of satellites. While most of Japan's space research is oriented toward the development of scientific payloads, which will require several years, the Japanese are still very much in the running for third in space.

Before the end of this year, the Japanese hope to orbit a small (25-pound) satellite using a native-designed booster designated Lambda IV-S. The Lambda IV-S is a four-stage vehicle using solid propellants. It is made up of a Lambda as first stage, the two-stage Kappa VIII as the second and third stages, and a small powered fourth stage which contains the satellite as well as an attitude control system. Components for the control system have already been purchased from the United States.

The Japanese plan to make three orbiting attempts with the Lambda IV-S between October 1965 and March 1966. If one of these achieves orbit and neither the French nor the Chinese Communists have succeeded by that time, the Japanese intend to give wide publicity to their claim of being third in space.

The Japanese have launched a number of multistage sounding rockets, including component stages of the Lambda IV-S. The chances are good that one of the three attempts to orbit a satellite will be successful.

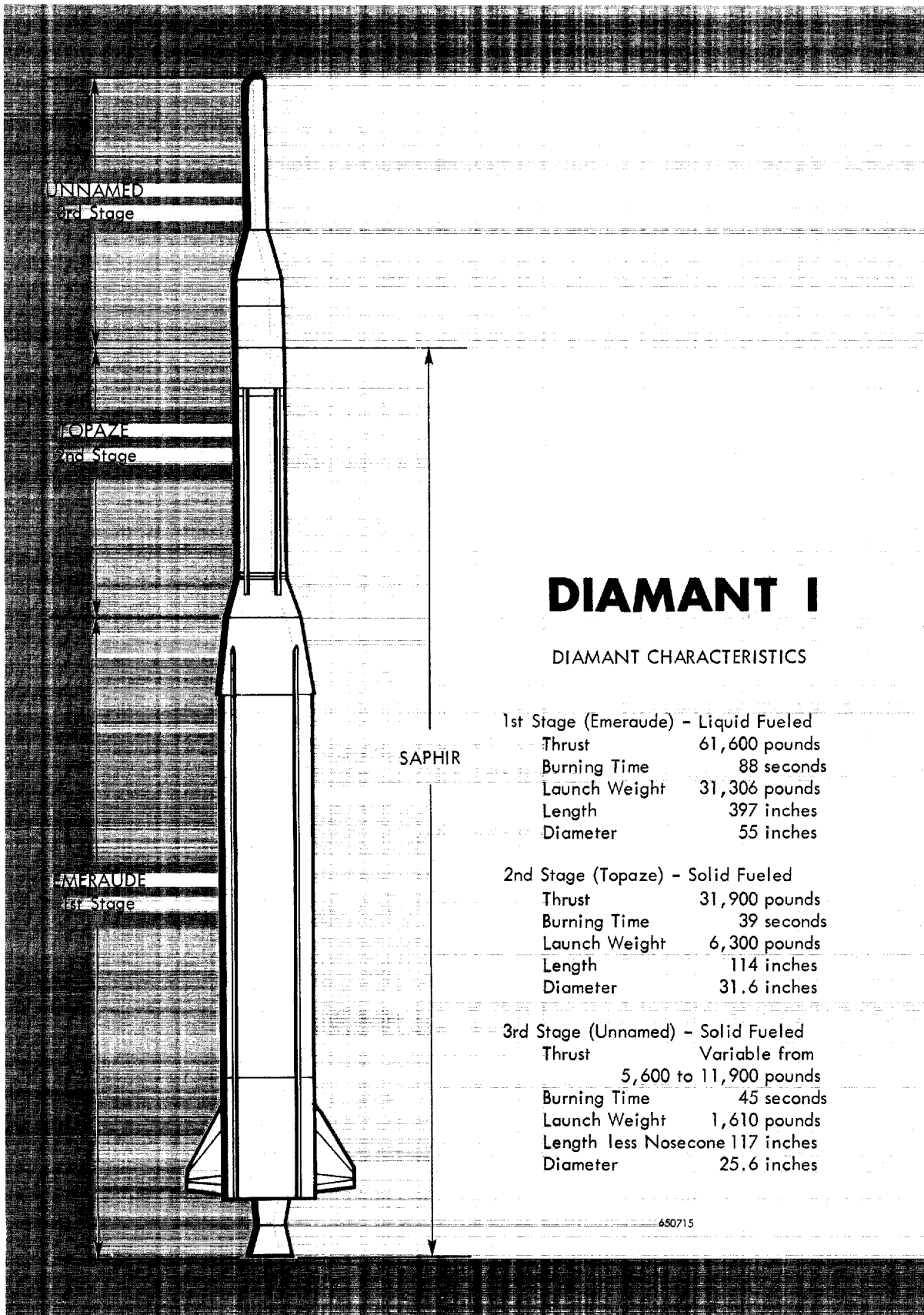
Communist China

In 1957, Communist China and the Soviet Union concluded an agreement which probably provided both for the supply of Soviet missiles to China and for the creation of a native missile development capability in China. This resulted in the

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construction of a missile test range in western China and a missile development center near Peiping.

The withdrawal in mid-1960 of most of the Soviets assisting in the project set the program back, but by 1963 there was clear evidence that the Chinese were proceeding with a missile program on their own. The Chinese are probably working on the development of a medium-range ballistic missile (MRBM) based on the design of the USSR's SS-4 (Sandal)--used by the Soviets as the first stage of the two-stage vehicle which orbits some of their earth satellites in the Cosmos series. There are some indications that the Chinese may have begun flight testing of such a missile late in 1963.

In September 1963, the Chinese conducted a static test of a new rocket motor at Chang Hsin Tien near Peiping. The rocket motor cannot be directly associated with any particular Chinese missile development program, but it could be for a short-range missile or for a propulsion unit of a second stage to be used with an MRBM to orbit a satellite.

The Chinese Communist leaders almost certainly would like to orbit an earth satellite as early as possible and probably would be willing to adapt any MRBM program to achieve this. They may have developed a first-stage booster based on the Soviet SS-4, they have tested a rocket motor which could be suitable for a second stage, and they are probably capable of producing the guidance

and other equipment necessary for putting a satellite into orbit. [REDACTED]

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[REDACTED] the Chinese plan to orbit a satellite and one specifies the date as 1 October 1965--National Day, China's principal political holiday. Thus, even though the evidence is fragmentary, China should be regarded as another country which might orbit a satellite within the next two years.

Others

There are several other nations or groups engaged in developing space programs but none is likely to put a satellite into orbit during the next year or so. The European Launcher Development Organization (ELDO)--a group of six west European countries and Australia working jointly to develop a satellite launch vehicle--has scheduled the launch of its booster vehicle, ELDO-A, for 1967. This program has run into technical problems, however, which may delay the launching. The Canadian Alouette and the Italian San Marco satellite projects will continue to use United States booster vehicles. The British do not have a satellite launching program which will show results within the next few years.

Egypt's once-high hopes for early success in space have waned as a result of technical difficulties. At present Egypt has only an unreliable rocket and an ineffective guidance system. Despite its ambitious claims, Indonesia also lacks a native capability to orbit a satellite in the near future. [REDACTED]

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